

Economic burden of eating disorders in South Korea

Sang Min Lee

Kyung Hee University School of Medicine

Minha Hong

Hanyang University College of Medicine, Myongji Hospital

Saengyeol Park

Kyung Hee University School of Medicine

Won Sub Kang

Kyung Hee University School of Medicine

In-Hwan Oh (✉ parenchyme@gmail.com)

Kyung Hee University School of Medicine

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Abstract

Background

Few studies have investigated the epidemiology of eating disorders using national representative data. In this study, we investigated the prevalence and economic burden of eating disorders in South Korea.

Methods

The aim of this study was to estimate the medical expenditure of diagnosed eating disorders (ICD F50.x) in South Korea between 2010 and 2015. We also examined the economic costs of eating disorders, including the direct medical cost, direct non-medical costs, and indirect costs, in order to calculate the economic burden of such disorders.

Results

The total prevalence of eating disorders in South Korea was 12.02 people (per 100 000) in 2010, and 13.28 in 2015. The cost of medical expenditures due to eating disorders increased from USD 1 229 724 in 2010 to USD 1 843 706 in 2015. The total economic cost of eating disorders was USD 5 455 626 in 2015. In 2015, the economic cost and prevalence of eating disorders was the highest in the 20–29 age group.

Conclusions

The results showed the eating disorders are insufficiently managed in the medical insurance system. Further research is therefore warranted to better understand the economic burdens of each type of eating disorder.

Plain English Summary

This article is the result of estimating the overall medical expenditures due to eating disorders in South Korea, a country that has introduced the National Health Insurance system, the prevalence rate based on this, and further the economic burden. It is a data that can grasp the status and actual condition of medical expenses due to eating disorders, and can be the basis for appropriate distribution of medical expenses and policy-making process in the future.

Background

There is evidence that eating disorders are increasing worldwide, and that they affect approximately 2 % of the world's population[1, 2]. Eating disorders may occur at a relatively young age, often beginning between 10–20 years of age[3], and may be chronic, lifelong conditions that are associated with various physical and psychiatric components[4, 5]. They are also one of the most common adolescent chronic disorders[6, 7], and friends and family often become informal long-term caregivers[8]. Among mental illnesses, eating disorders have the highest lifetime mortality rate (up to 20 %); the mortality rate among women with eating disorders is twelve times higher than it is for unaffected women[9, 10]. When compared with the general population, people with eating disorders have nearly double the mortality rate of those who are unaffected[11].

A study of patients with eating disorders in the United States found that the majority of patients did not seek treatment for the eating disorder itself[5]. Even when eating disorders are treated, medication has limited efficacy and, in general, more than half the patients with anorexia and bulimia nervosa do not recover fully[1, 6]. One in four people with anorexia nervosa develops long-term impairment in social functioning and employment, to the extent that they cannot be gainfully employed. The quality of life for patients with eating disorders deteriorates more than it does for patients with symptomatic coronary heart disease or major depression, and the duration of illness tends to be longer[12].

Treatment guidelines recommend the active involvement of family members in the treatment of eating disorders[13]. Patients with severe and long-lasting anorexia nervosa are highly dependent on their families, creating a subsequently high caregiving burden[14]. The socio-economic burden and costs of anorexia nervosa and bulimia nervosa are similar to those of anxiety disorders and depression[6], as quantified by the Global Burden of Disease Study conducted in 2013[15].

Studies have been conducted in Europe to estimate the size and cost of eating disorders, but most have included only anorexia nervosa and bulimia nervosa; this led to a gross underestimation of the problem, because binge eating and unspecified eating disorders are in fact the most commonly occurring disorders[16]. Those studies also did not include key resource items: the cost of lost productivity for the entire family, and indirect costs due to reduced length of life and health[6, 16].

There have been very few studies of epidemiology of eating disorders completed in South Korea. Lee et al. published a psychiatric epidemiology of major disorders using DSM-III criteria[17, 18]. Cho et al. reported that the lifetime prevalence of eating disorders using DSM-IV criteria in Korea was 0.2 %[19].

Globally, several studies have systematically reviewed the disease burden of eating disorders. Extant studies of eating disorders tend to have poor data representation due to the lack of large-scale population based studies and the inconsistencies of studies[15]. This study analyzed the healthcare costs of anorexia nervosa, bulimia nervosa, and other eating disorders, such as binge eating disorder and eating disorders not otherwise specified, over a six-year period. Using representative health statistics and health insurance data from 2010 to 2015, we attempted to estimate the national burden and economic costs of eating disorders on medical care utilization and to explore the characteristics of this burden with respect to gender and age groups.

Methods

Data Sources

This study utilized two government data sources for its analysis. The prevalence rates and medical expenditure of eating disorders were calculated using data from the Health Insurance Review & Assessment Service (HIRA). The database provided records of patient numbers and specified outpatient, inpatient, and hospitalization days by gender. The economic cost of eating disorders was derived from the data of the National Health Insurance Services (NHIS), which is the single insurer in South Korea [20]. The NHIS provides medical costs based on the medical utilization records from the National Health Information Database (NHID). Data from January 1, 2020 to December 31, 2015 were collected from both HIRA and NHIS. Population statistics were adopted from the Korean Statistical Information Service (KOSIS). Average currency rates per year were adopted from the Bank of Korea (<http://ecos.bok.or.kr>) to convert the Korean Won to US dollars (USD). The data supporting this study's findings are available on request from the corresponding author, but are not publicly available due to privacy or ethical restrictions.

Case Definition

Eating disorders (F50) were defined using the International Classification of Diseases, Tenth Revision (ICD-10)[21]. For estimation of the economic burden, eating disorders were as: anorexia nervosa (F50.0); bulimia nervosa (F50.2); and other eating disorders (OED) (F50.1–F50.9). OED included atypical anorexia nervosa (F50.1); atypical bulimia nervosa (F50.3); overeating associated with other psychological disturbances (F50.4); vomiting associated with other psychological disturbances (F50.5); other eating disorders (F50.8); and unspecified eating disorder (F50.9).

Prevalence Rates of Eating Disorders

The prevalence rates of eating disorders from 2010 to 2015 were estimated using the number of cases from HIRA Service. The number of cases was divided by the total population and then multiplied by 100 000.

Estimation of the Economic Burden of Eating Disorders

The present study estimated the medical expenditure and economic cost of eating disorders (anorexia nervosa, bulimia nervosa, OED) using data from HIRA and NHIS. Medical expenditure was determined by the HIRA data regarding expenditures from both the national insurance service and patients. Economic cost, both direct and indirect, was estimated using a prevalence-based approach from NHIS data.

Direct costs included the total costs associated with medical treatment, transportation, and caregivers. Medical costs included non-covered care costs, insured and non-insured costs, and drug costs. To estimate hospital transportation costs, round-trip transportation costs were taken from the Korean Health Panel. Also, caregiver costs were calculated using data from the Korea Patient Helper Society.

Indirect costs-2 was estimated to explain productivity loss caused by the absence from work for hospital admissions or outpatient visits. Indirect costs-2 was included in the total costs. For sensitivity purposes, indirect costs-1 was estimated by considering lost productivity. Productivity lost was defined as the loss of ones' time due to medical care. To estimate the productivity lost we used time spent traveling to hospital and waiting for treatment and multiplied the average time spent by the average daily wage. For example, when a patient took the day off due to hospitalization, it was considered as the loss of one day's income. In case of an outpatient visit, it was considered as the loss of one-third of daily income. Data were not available for those under 20 years old as they are too young to work. Indirect costs-1 was not included in the total costs. Total economic cost was taken as the sum of direct and indirect costs.

All analyses were performed using SAS (ver. 9.4; SAS institute, Cary, NC, USA).

Ethics Statement

Ethical review was obtained by a University review board (IRB No. KHSIRB-19-354 (EA)). Informed consent was exempted due to the public nature of the NHIS data. The information is gathered by ID number, it is not identifiable.

Results

The current study investigated the prevalence rates of eating disorders and patients' use of medical care between 2010 and 2015, in addition to evaluating the economic burden of eating disorders in Korea in 2015.

The results of this study showed that the prevalence rates of eating disorders tended to increase from 2010 to 2013 and then decreased slightly from 2014 to 2015 (Table 1 and Figure 1). The medical expenditure of eating disorders consistently increased from USD 1 229 724 in 2010 to USD 1 843 706 in 2015. Cases of bulimia nervosa increased from 2010 to 2015. In addition, a gender differential was observed in the economic burden of eating disorders from 2010 to 2015; the discrepancy was higher in female patients than in to male patients.

Table 1. Prevalence of eating disorders in Korea from 2010 to 2015 by gender (per 100 000).

| Year | Eating disorders Number of patients Prevalence | | | Anorexia nervosa Number of patients Prevalence | | | Bulimia nervosa Number of patients Prevalence | | | Other eating disorders Number of patients Prevalence | | | Medical expenditure of eating disorders | | |
|------|--|-------|--------|--|------|--------|---|------|--------|--|------|--------|---|-----------|------------|
| | Sub total | Male | Female | Sub total | Male | Female | Sub total | Male | Female | Sub total | Male | Female | Male | Female | Total cost |
| 2010 | 6 074 | 1 010 | 5 064 | 1 511 | 376 | 1 135 | 1 399 | 72 | 1 327 | 3 366 | 572 | 2 794 | 131 770 | 1 097 954 | 1 229 72 |
| | 12.02 | 3.99 | 20.09 | 2.99 | 1.49 | 4.50 | 2.77 | 0.28 | 5.26 | 6.66 | 2.26 | 11.08 | | | |
| 2011 | 6 694 | 1 070 | 5 624 | 1 570 | 405 | 1 165 | 1 440 | 74 | 1 366 | 3 888 | 607 | 3 281 | 135 824 | 1 298 591 | 1 434 41 |
| | 13.19 | 4.21 | 22.21 | 3.09 | 1.59 | 4.60 | 2.84 | 0.29 | 5.39 | 7.66 | 2.39 | 12.95 | | | |
| 2012 | 7 052 | 1 187 | 5 865 | 1 534 | 369 | 1 165 | 1 600 | 92 | 1 508 | 4 151 | 754 | 3 397 | 155 809 | 1 314 500 | 1 470 31 |
| | 13.84 | 4.65 | 23.05 | 3.01 | 1.45 | 4.58 | 3.14 | 0.36 | 5.93 | 8.15 | 2.96 | 13.35 | | | |
| 2013 | 7 388 | 1 301 | 6 087 | 1 905 | 478 | 1 427 | 1 597 | 111 | 1 486 | 4 099 | 727 | 3 372 | 123 037 | 1 506 356 | 1 629 39 |
| | 14.45 | 5.08 | 23.82 | 3.72 | 1.87 | 5.58 | 3.12 | 0.43 | 5.82 | 8.02 | 2.84 | 13.20 | | | |
| 2014 | 7 364 | 1 204 | 6 160 | 1 793 | 457 | 1 336 | 1 681 | 93 | 1 588 | 4 110 | 680 | 3 430 | 175 329 | 1 631 515 | 1 806 84 |
| | 14.35 | 4.69 | 24.01 | 3.49 | 1.78 | 5.21 | 3.28 | 0.36 | 6.19 | 8.01 | 2.65 | 13.37 | | | |
| 2015 | 6 845 | 1 129 | 5 716 | 1 604 | 397 | 1 207 | 1 832 | 123 | 1 709 | 3 614 | 630 | 2 984 | 138 939 | 1 704 767 | 1 843 70 |
| | 13.28 | 4.38 | 22.18 | 3.11 | 1.54 | 4.68 | 3.56 | 0.48 | 6.63 | 7.01 | 2.45 | 11.58 | | | |

Note. Data sources from Healthcare Bigdata Hub (<https://opendata.hira.or.kr/>) and Korean Statistical Information Service (KOSIS); size of population = 50,515,666 (female 25 205 281; 2010); 50 734 284 (female 25 327 350; 2011); 50 948 272 (female 25 444 212; 2012); 51 141 463 (female 25 553 127; 2013); 51 327 916 (female 25 658 620; 2014); 51 529 338 (female 25 771 152; 2015); Exchange rate US dollar: 1 Korean won = 1 132 US dollar (2015); 1 053 (2014); 1 095 (2013); 1 127 (2012); 1 108 (2011); 1 156 (2010); from the Bank of Korea (<http://ecos.bok.or.kr/>).

Table 2 shows the medical care use of eating disorders, including anorexia nervosa, bulimia nervosa, and OED, from 2010 to 2015. There was an inconsistent increase in the number of outpatient visits of patients afflicted with different types of eating disorders. The number of inpatient admissions decreased for patients with bulimia nervosa but increased in the cases with anorexia nervosa and OED. Hospitalization days per patient inconsistently decreased in anorexia nervosa and bulimia nervosa, but increased in OED.

Table 2. Patient's medical care use for eating disorders from 2010 to 2015.

| Year | Eating disorders | | | Anorexia nervosa | | | Bulimia nervosa | | | Other |
|------|---|--|------------------------------------|---|--|------------------------------------|---|--|------------------------------------|-------|
| | Number of outpatient visits (per patient) | Number of inpatient admissions (per patient) | Hospitalization days (per patient) | Number of outpatient visits (per patient) | Number of inpatient admissions (per patient) | Hospitalization days (per patient) | Number of outpatient visits (per patient) | Number of inpatient admissions (per patient) | Hospitalization days (per patient) | |
| 2010 | 3.27 | 1.72 | 31.16 | 2.43 | 1.51 | 28.32 | 4.03 | 1.67 | 37.62 | 3.19 |
| 2011 | 3.07 | 1.80 | 30.40 | 2.30 | 1.93 | 34.26 | 4.20 | 1.77 | 32.95 | 2.92 |
| 2012 | 3.54 | 1.79 | 30.48 | 2.73 | 1.97 | 35.17 | 4.57 | 1.63 | 29.07 | 3.25 |
| 2013 | 3.49 | 1.82 | 29.83 | 2.49 | 1.90 | 35.11 | 4.44 | 1.78 | 22.76 | 3.42 |
| 2014 | 3.51 | 1.71 | 28.69 | 2.71 | 1.65 | 29.42 | 4.16 | 1.66 | 25.78 | 3.15 |
| 2015 | 3.86 | 1.65 | 27.01 | 2.86 | 1.62 | 27.26 | 4.52 | 1.63 | 28.25 | 3.40 |

Note. Data source from Healthcare Bigdata Hub (<https://opendata.hira.or.kr/>).

Table 3 shows the economic burden of eating disorders including anorexia nervosa, bulimia nervosa, and OED by gender in 2015. The economic cost of eating disorders was 5 455 626 USD. Total costs were approximately 6 times higher in female patients than male patients. Direct costs were higher than indirect costs-2 in all types of eating disorders. OED were the highest contributor to the economic burden among anorexia nervosa, bulimia nervosa, and OED.

Table 3 Economic cost of eating disorders in 2015.

| Classification | Eating disorders | | | Anorexia nervosa | | | Bulimia nervosa | | | Other eating disorders | |
|---|------------------|-----------|-----------|------------------|-----------|-----------|-----------------|-----------|-----------|------------------------|-----------|
| | Male | Female | Sub total | Male | Female | Sub total | Male | Female | Sub total | Male | Female |
| Direct costs | | | | | | | | | | | |
| Direct medical costs | 246 792 | 2 572 075 | 2 818 867 | 91 585 | 1 037 569 | 1 129 154 | 31 420 | 737 817 | 769 237 | 123 786 | 796 690 |
| Direct non-medical costs | | | | | | | | | | | |
| Transportation cost for hospital visits | 11 492 | 84 283 | 95 776 | 4 402 | 20 806 | 25 208 | 1 275 | 27 047 | 28 322 | 5 815 | 36 430 |
| Caregiver cost | 79 798 | 405 167 | 484 965 | 44 865 | 213 194 | 258 059 | 5 964 | 67 603 | 73 568 | 28 969 | 124 370 |
| Total direct costs | 338 082 | 3 061 526 | 3 399 608 | 140 852 | 1 271 569 | 1 412 421 | 38 660 | 832 467 | 871 127 | 158 570 | 957 490 |
| Indirect costs-2 | 453 177 | 1 602 841 | 2 056 018 | 132 185 | 353 510 | 485 694 | 18 772 | 328 218 | 346 991 | 302 220 | 921 113 |
| Total costs | 791 259 | 4 664 367 | 5 455 626 | 273 037 | 1 625 078 | 1 898 115 | 57 432 | 1 160 686 | 1 218 118 | 460 790 | 1 878 602 |

Note. Exchange rate US dollar: 1 Korean won = 1 132 US dollar from the Bank of Korea (<http://ecos.bok.or.kr/>); For indirect costs-2, productivity loss from the absence from work due to hospital admission and outpatient visits were included.

Table 4 shows the results of the sensitivity analysis for the economic burden of eating disorders in 2015. OED were the highest contributor to the economic burden and females were a higher contributor to the economic burden than males in indirect costs-1.

Table 4. Sensitivity analysis of indirect costs for economic cost of eating disorders in 2015.

| Classification | Eating disorders | | | Anorexia nervosa | | | Bulimia nervosa | | | Other eating disorders | | |
|------------------|------------------|-----------|-----------|------------------|---------|-----------|-----------------|---------|-----------|------------------------|-----------|-----------|
| | Male | Female | Sub total | Male | Female | Sub total | Male | Female | Sub total | Male | Female | Sub total |
| Indirect costs-1 | 920 012 | 3 064 617 | 3 984 629 | 157 353 | 638 689 | 796 043 | 24 599 | 552 534 | 577 132 | 738 060 | 1 873 394 | 2 611 454 |

Note. Indirect costs-1 is different from indirect costs-2. Indirect costs-1 was estimated for the purpose of sensitivity analysis without the employment-to-population ratio (i.e., proportion of the population employed). Indirect costs-1 was not included in the total costs.

Table 5 and Figures 2 and 3 show the economic burden of eating disorders in Korea in 2015 by age and gender. The economic burden of eating disorders was higher in patients aged between 20 years and 29 years than other age ranges. Anorexia nervosa was higher in patients aged between 10 years and 19 years than other age ranges. Bulimia nervosa was higher in patients aged between 20 years and 29 years than other age ranges. OED were higher in patients aged 50 years and 59 years than other age ranges. In general, female patients showed higher economic burden than male patients. In addition, younger generations showed a higher economic burden than older generations, except for in the case of OED.

Table 5 Economic cost of disease due to eating disorders in Korea in 2015 by age group.

| Age range | Eating disorders | | | | | | Anorexia nervosa | | | | | |
|-----------|------------------|-----------|-----------|---------------|-----------|-----------|------------------|-----------|-----------|---------------|---------|-----------|
| | Direct cost | | | Indirect cost | | | Direct cost | | | Indirect cost | | |
| | Male | Female | Sub total | Male | Female | Sub total | Male | Female | Sub total | Male | Female | Sub total |
| 0-9 | 29 659 | 41 561 | 71 220 | - | - | - | 16 507 | 20 429 | 36 936 | - | - | - |
| 10-19 | 58 076 | 766 065 | 824 141 | - | - | - | 29 904 | 507 441 | 537 345 | - | - | - |
| 20-29 | 59 903 | 913 172 | 973 075 | 22 652 | 390 672 | 413 324 | 12 388 | 274 955 | 287 343 | 5 134 | 126 763 | 131 897 |
| 30-39 | 42 248 | 688 260 | 730 507 | 126 348 | 427 966 | 554 314 | 26 783 | 237 700 | 264 483 | 105 300 | 166 309 | 271 609 |
| 40-49 | 16 621 | 293 279 | 309 900 | 30 714 | 200 841 | 231 555 | 4 100 | 118 678 | 122 778 | 7 081 | 42 819 | 49 901 |
| 50-59 | 16 330 | 89 894 | 106 224 | 23 474 | 574 452 | 597 925 | 7 170 | 25 813 | 32 984 | 10 143 | 13 574 | 23 717 |
| 60-69 | 27 404 | 34 994 | 62 398 | 240 666 | 4 301 | 244 967 | 5 041 | 10 934 | 15 975 | 1 894 | 1 321 | 3 215 |
| 70-79 | 47 007 | 98 324 | 145 331 | 4 483 | 3 213 | 7 697 | 24 946 | 45 507 | 70 453 | 2 544 | 1 555 | 4 099 |
| 80-89 | 40 834 | 135 978 | 176 812 | 4 840 | 1 395 | 6 236 | 14 013 | 30 113 | 44 125 | 88 | 1 167 | 1 255 |
| Total | 338 082 | 3 061 526 | 3 399 608 | 453 177 | 1 602 841 | 2 056 018 | 140 852 | 1 271 569 | 1 412 421 | 132 185 | 353 510 | 485 694 |

Note. Exchange rate US dollar: 1 Korean won = 1 132 US dollar from the Bank of Korea (<http://ecos.bok.or.kr/>).

Discussion

Population-representative epidemiological research studies on eating disorders are rare. Despite the knowledge that eating disorders have an early onset, few studies have been conducted on eating disorders among children and young people under the age of 18[23]. The current study is meaningful, in that its use of a nationwide database means that it represents all of South Korea, including patients of all ages. It included eating disorder with ICD F50.x in its entirety and was not limited to anorexia nervosa and bulimia nervosa alone.

The recent systematic review reported that the estimated lifetime prevalence of eating disorder was 1.01 % (95 % CI, 0.54-1.89)[24]. It is noteworthy that the lifetime prevalence reported from studies conducted in Western countries (1.29 %) was 6.1-fold greater than that reported in a single study from South Korea (0.21 %)[24]. The current study found that the prevalence of eating disorders in South Korea was between 12.02 (0.012 %) in 2010 and 13.28 (0.013 %) in 2015. This implies that it can update the prevalence of eating disorders in South Korea, even though our study method and case definition varied from that of Cho et al[19]. The estimated total economic cost of eating disorders in the current study was USD 5 455 626, which is equivalent to 0.0039 % of Korean GDP in 2015. Those with OED, including binge eating disorder, accounted for 42 % of the economic burden; anorexia nervosa, 34.7 %; and bulimia nervosa, 22.3 %. Our results are underestimated because the study did not take into account the negative impact of eating disorders on individual health, or socio-economic well-being. Given this, the actual economic costs can be expected to be much higher. In terms of gender, the prevalence of eating disorders among females was high (4.68–5.27 times) in our study, and the medical expenditure for females was more than twice as high (8.33–12.26 times), compared to the prevalence. In addition, in the proportion of economic burden, the ratio of direct medical cost is significantly higher for women compared to men (55 % vs 31 %). This is thought to be, in part, due to general gender differences in seeking diagnostic evaluation or healthcare treatment, and receiving more prescription drugs[25-27]. As shown by previous studies, the current study found that the disease burden of eating disorders was high in adolescent and early adult ages. This implies that disease burden is likely underestimated, because it is a condition that can be chronic and progressive[28].

A few limitations in the present study must be noted. First, the data was collected from a secondary database, the NHIS claims database, and not from medical records. It considers only the burden of disease based on patients who sought treatment. Also, we did not consider either psychiatric or physical comorbid disorders. Therefore, questions about the validity of the diagnosis and comorbidity information across hospitals may be raised. In addition, we used the number of hospitalizations and frequency of outpatient visits to ensure accuracy. Another limitation is that binge eating disorder, which has of clinical importance was added to the DSM-5 in 2013, and was not reflected in the ICD diagnostic system during the study period; therefore in our study, it is included under unspecified eating disorders. Although, we used the nationally representative database (i.e. HIRA), the prevalence rates may not represent patients with eating disorders of South Korea, due to the nature of the database using medical records. Thus, future research may replicate this study by assessing another database to calculate the prevalence rates of South Korea.

Conclusion

Despite these limitations, this study is meaningful in that it has calculated the prevalence and economic burden of eating disorders using national representative data. Eating disorders create severe and disabling conditions for the afflicted individual, their families, and society at large, but are often overlooked. In particular, this study is unique in its inclusion of other eating disorder groups, including binge eating disorder; most previous studies examined only bulimia nervosa and anorexia nervosa. The findings from the current study contribute to the evidence base from which suggestions for improvements in health service can be made, and to make policy- and service-planning more effective.

Declarations

Ethics approval and consent to participate

Ethical review was obtained by a University review board (IRB No. KHSIRB-19-354 (EA)). Informed consent was exempted due to the public nature of the data sources of NHIS.

Consent for publication

Not applicable

Availability of data and materials

No additional data available

Competing interests

The authors declare that they have no competing interests.

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Authors' contributions

S.M.L and I.H.O conceptualized the study and were major contributors to writing the manuscript. S.P and M.H analyzed the data and contributed to organizing data collection. W.S.K assisted in manuscript revision and interpretation. All authors read and approved of the final manuscript.

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A part of this study was presented at WPA 2019 as an oral presentation

Abbreviations

DSM: Diagnostic and Statistical Manual

HIRA: Health Insurance Review & Assessment Service

NHIS: National Health Insurance Services

NHID: National Health Information Database

KOSIS: Korean Statistical Information Service

ICD: International Classification of Diseases

OED: other eating disorders

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Figures

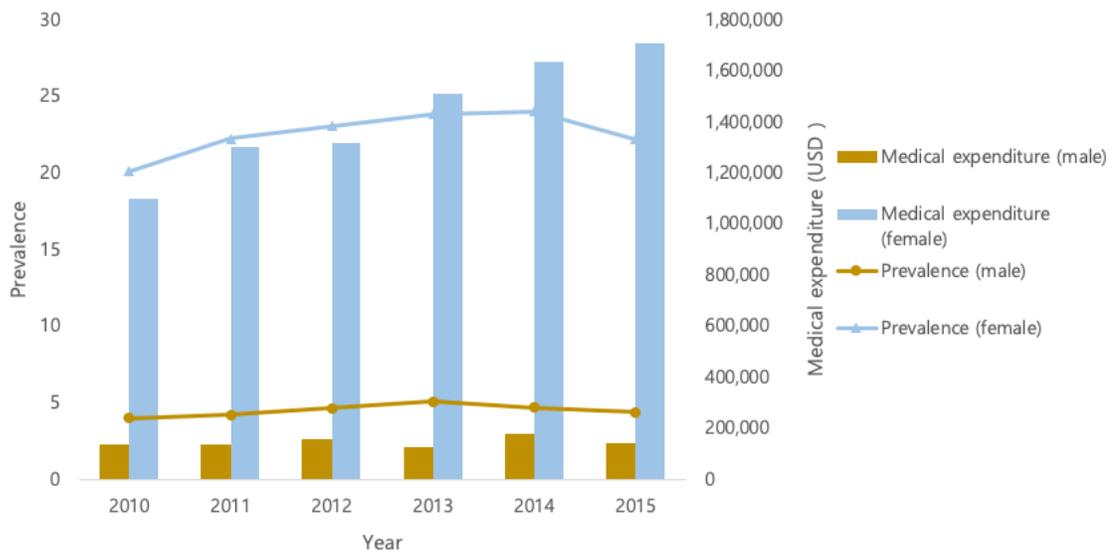


Figure 1

Prevalence of eating disorders in Korea from 2010 to 2015 (per 100 000)

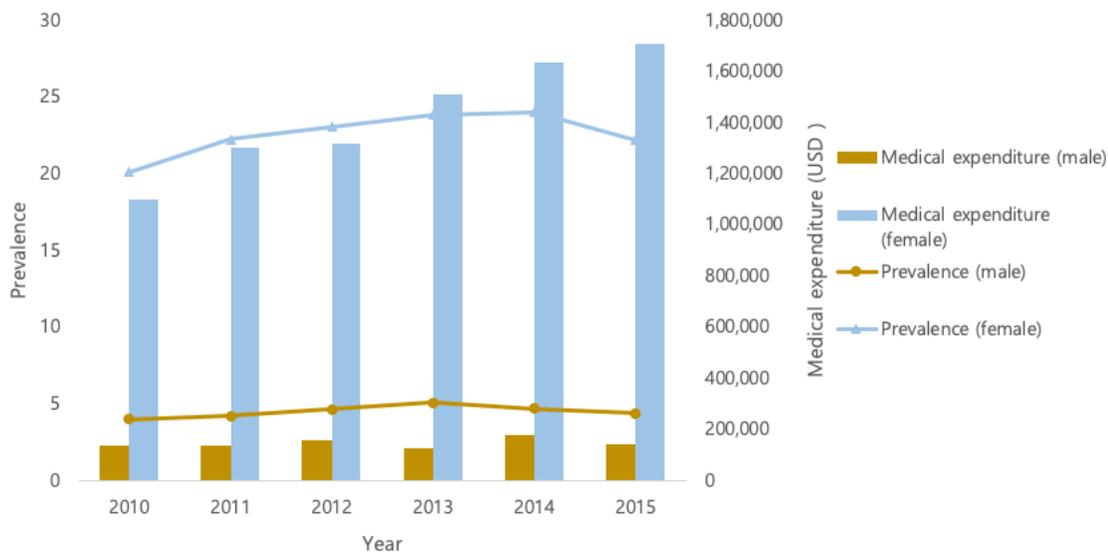


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Prevalence of eating disorders in Korea from 2010 to 2015 (per 100 000)

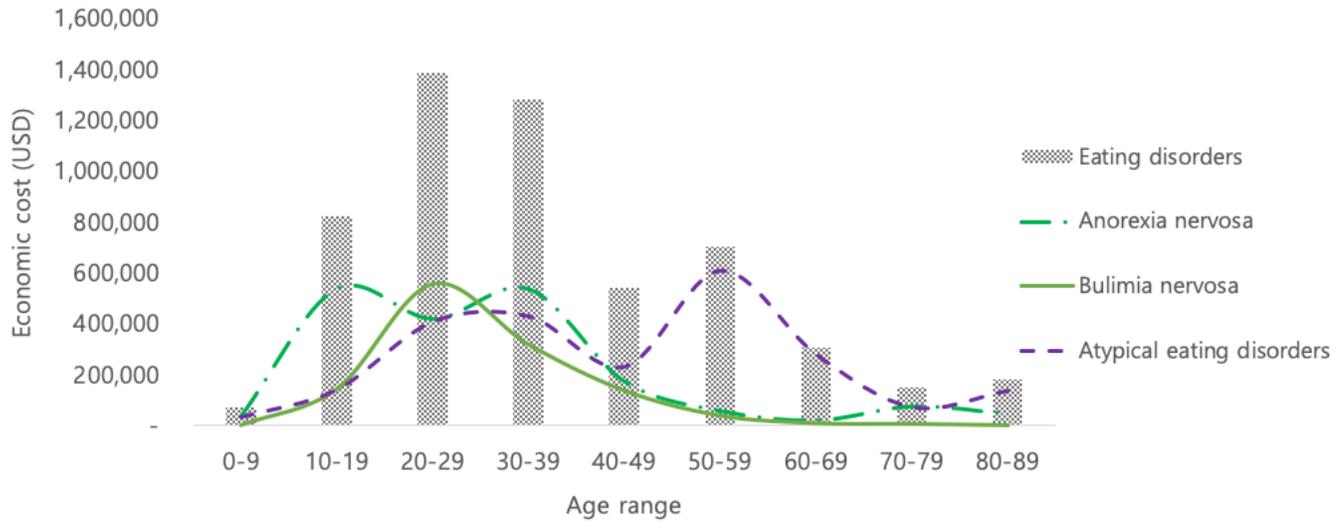


Figure 2

Economic burden of eating disorders in Korea in 2015 by age

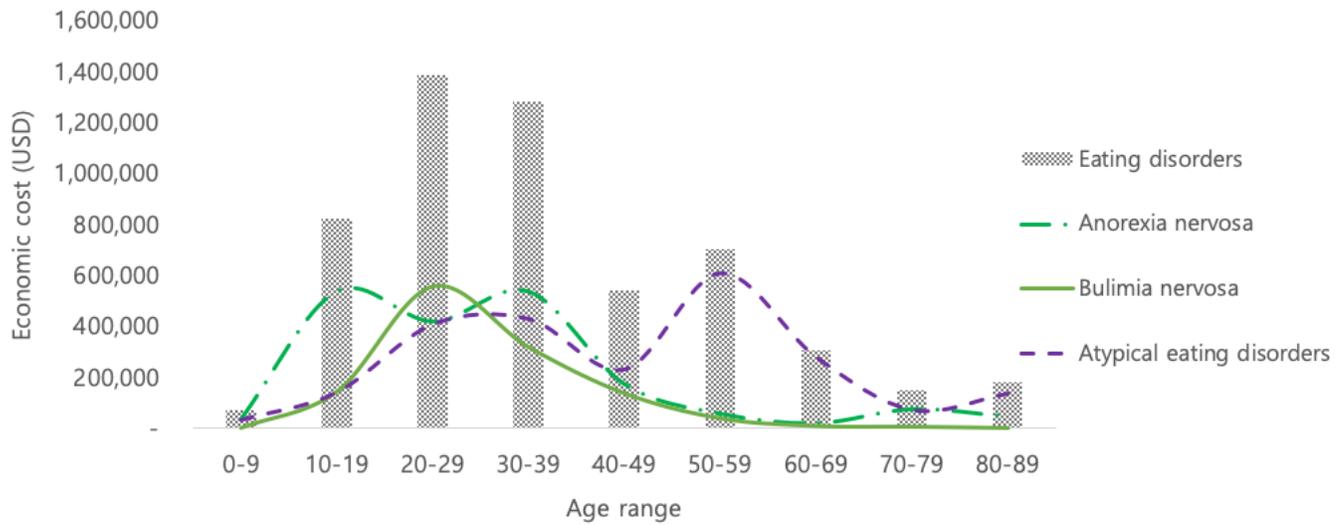


Figure 2

Economic burden of eating disorders in Korea in 2015 by age

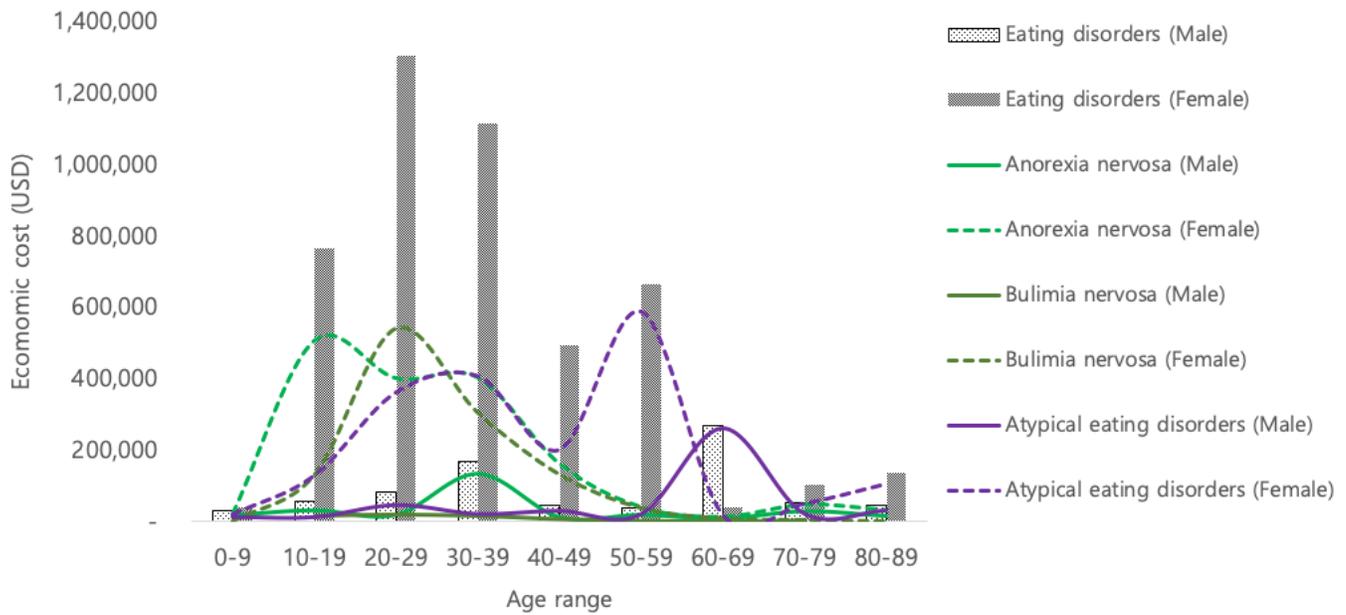


Figure 3

Economic burden of eating disorders in Korea in 2015 by gender and age

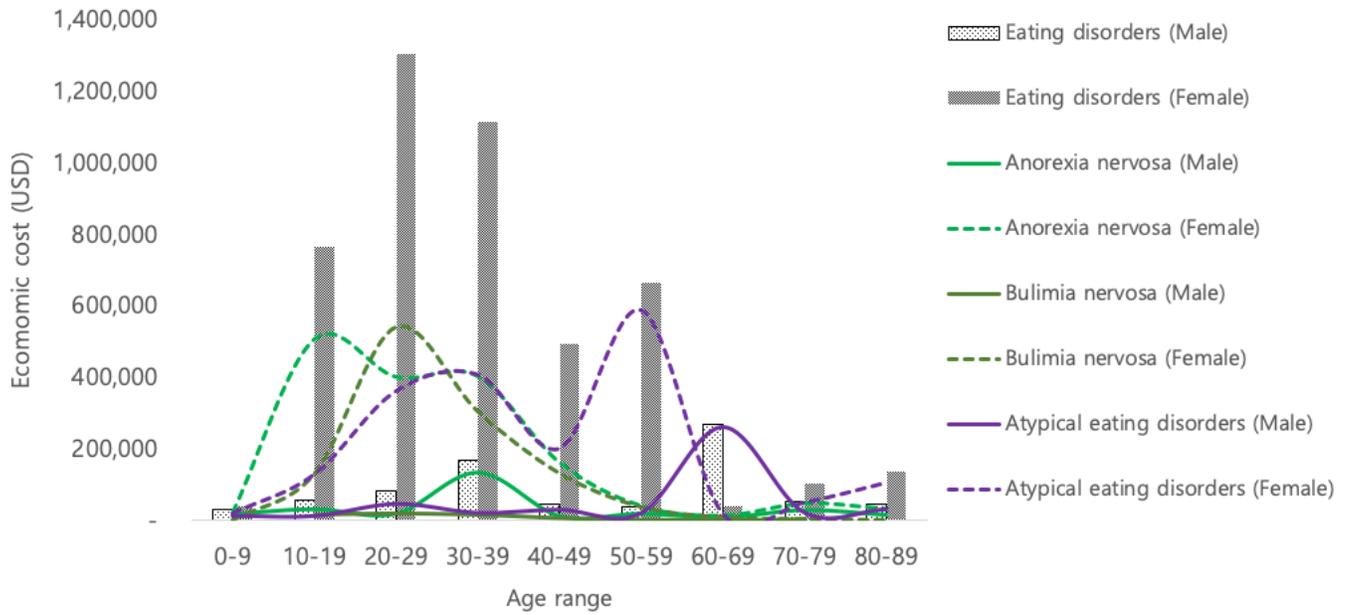


Figure 3

Economic burden of eating disorders in Korea in 2015 by gender and age